Lab 05 **CSC 470-03** **Spring 2016**

Objectives

- Practice using Array iteration methods to perform compact computations.

Instructions

This lab has two parts. Both parts use the data set in the file `ancestry.js`. You may also use the functions provided in the `ave_age.js` example file.

Note: you must load the `ancestry.js` script in an HTML file to get access to the data. See `ave_age.html`.

In Part 1 compute the number of men in the Haverbeke family tree that are over 50, the number of women over 50, the number of men under 50 and the number of women under 50. You will need to create a new filter function named `over50(age)` that returns `true` if `age > 50` and `false` otherwise. You may also define a second filter function named `under50(age)` that returns `true` if `age <= 50` and `false` otherwise, but this is optional. Each of the four values must be computed with a single statement using the Array object's `filter()` and `map()` methods.

In Part 2 compute the mean and standard deviation of the ages of all men and all women separately in the Haverbeke family tree. Note that the function for computing mean, called `ave()`, is provided already in the `ave_age.js` example file. The definition of standard deviation is as follows.

$$stdev = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \overline{x})^2}{n-1}}$$

where:

x_i is the i[th] age in the array
n is the total number of ages
$\overline{x}$ is the average of all ages

Write a `stdev(ages, mean)` function that is similar to the `ave(ages)` function provided. Here `ages` is an array of all ages and `mean` is the average of all ages. To define the `stdev(…)` function consider starting by mapping a new anonymous function over the `ages` array to return an array of differences between each age and the mean. This is $(x_i - \overline{x})$ part of the stdev formula. Then consider writing a `sum_square(prev, diff)` function that squares `diff`, adds to `prev`, and returns the result. This function may be passed to the `reduce()` method of the differences array to compute the sum of squares part of `stdev()`. Divide the result by `(n-1)` and take the square root to produce the standard deviation.

The standard deviation of the ages of all men and all women each should be calculated in single but separate expressions, similar to the way average ages are calculated. Note that average ages must be calculated first as the average age of all men and average age of all women are required to be passed to `stdev(…)` as the `mean` parameter. Your output should look similar to the following.

```
men over 50: 14
women over 50: 9
men under 50: 7
women under 50: 9
male age. ave: 61.666666666666664 stdev: 18.612719665146553
female age. ave:  54.55555555555556 stdev: 21.233220980402724
```

Requirements

- You MUST enter header comments in your JavaScript code including (1) your name, (3) description and or purpose of the assignment.
- You MUST comment your code, explaining what you did in each section.
- Submit the HTML and/or JavaScript files using Canvas under the appropriate assignment.